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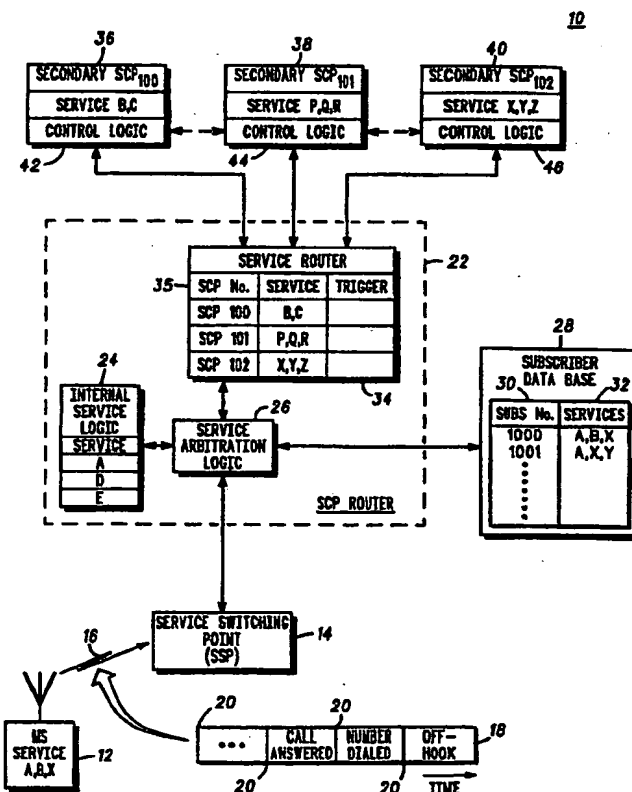
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(54) Title: COMMUNICATION SYSTEM AND SERVICE CONTROLLER FOR CALL HANDLING

(57) Abstract

The figure illustrates the architecture of an intelligent network (10). In response to a trigger (20) in a call (18), service arbitration logic (26) of a Service Control Point (SCP) router (22) provides a particular service to a subscriber unit (12) by routing the subscriber unit (12) to a pertinent location in which that particular service logic resides. The location may be in a proprietary, secondary SCP (42-46) belonging to a third party. As such, service functionality may be distributed and controlled between the SCP router (22) and at least one secondary SCP responsive thereto.



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COMMUNICATION SYSTEM AND SERVICE CONTROLLER FOR CALL HANDLING

Background of the Invention

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This invention relates, in general, to a communication system, and is particularly, but not exclusively, applicable to an intelligent network in which a multitude of communication services may be provided to a subscriber unit in response to a call trigger.

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Summary of the Prior Art

The evolution of present day communication systems, such as cellular communication systems and landline-based systems, has resulted in the
15 realisation of intelligent networks. As will be appreciated, intelligent networks allow an interaction between a service switching point (SSP), responsible for the control and routing of a call, and a service control point (SCP) for the invocation of an "IN" service resident on the SCP. More particularly, the interaction occurs if "triggers" are invoked at the SSP,
20 which triggers are generated by suitable break-points in a standard communication call model, e.g. when the call produces an off-hook signal or after the call has progressed to the number dialled stage. As such, each trigger may invoke a particular service that is used to establish a call, and that is pertinent to a particular point in time in the sequence of events of
25 the communication call model.

Presently, when a trigger is invoked, there is only one SCP address to contact, which single SCP address provides a solitary service, such as voice, data or video. However, a management problem arises when a
30 subscriber unit wishes to utilise multiple IN service and these multiple services are invoked by the same single trigger in the SSP. Additionally, the rigid architecture of present intelligent networks precludes a third party from providing an IN service from a proprietary SCP, which further limits a subscriber unit's choice (from all potentially available services)
35 and restricts a subscriber unit from obtaining a comprehensive selection of services.

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Accordingly, a need exists for an improved intelligent network architecture that can integrate and manage proprietary services provided by numerous SCPs.

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Summary of the Invention

According to a first aspect of the present invention there is provided a communication system for providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the subscriber unit during a call, the communication system comprising: a service control point (SCP) router, responsive to the trigger, having a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber unit in the list, the SCP router further comprising means for identifying an address of the at least one subscriber affiliated service in the system and means for invoking the at least one subscriber affiliated service for use by the subscriber unit through the routing of the subscriber unit to the address so identified.

In a second aspect of the present invention there is provided a service controller for call handling in an intelligent network, the service controller providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the subscriber unit during a call, the service controller having: a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber unit in the list; means for identifying an address of the at least one subscriber affiliated service in the system; and means for invoking the at least one subscriber affiliated service for use by the subscriber unit through the routing of the subscriber unit to the address so identified.

An exemplary embodiment of the present invention will now be described with reference to the accompanying drawing.

Brief Description of the Drawings

FIG. 1 is a block diagram of an intelligent network that provides multiple services to a subscriber unit in response to a call trigger, in accordance with a preferred embodiment of the present invention.

Detailed Description of a Preferred Embodiment

Referring to FIG. 1, there is shown, in accordance with a preferred
5 embodiment of the present invention, a block diagram of an intelligent
network 10 that provides multiple services to a subscriber unit in response
to a call trigger.

A subscriber unit (which may be a mobile unit) 12 communicates with a
10 service switching point (SSP) 14 via a communication link 16, such as a
radio channel or landline. The subscriber unit 12 can command services
A, B and X from a range of services provided by the network 10. As will be
appreciated, in a mobile communication system, such as the Groupe
Speciale Mobile (GSM) pan-European cellular communication system, a
15 mobile switching centre (MSC) performs the tasks of a SSP, and is
arranged to intelligently direct mobile terminated calls, for example, to a
relevant destination or service. A typical model of a call 18, communicated
over the communication link 16, is illustrated in the figure. More
particularly, the model of a call 18 comprises a plurality of discrete
20 sections, such as "Off-Hook", "Number Dialed" and "Call Answered".
Moreover, the boundaries 20 between these discrete sections provide
"trigger" opportunities for the intelligent network, as will be understood by
a skilled addressee. In this respect and unlike prior art systems, services
A, B and X of subscriber unit 12 may potentially all be triggered from any
25 single boundary event 20.

The SCP 14 is coupled to a (primary) SCP router 22 that is arranged to
route particular services to the subscriber unit 12 in response to a
triggered request (provided by a suitable boundary 20 in the call). The SCP
30 router 22 comprises internal service logic 24 that provides the necessary
logic for services A, D and E, and service arbitration logic (i.e. a processor)
26 coupled to the internal service logic 24 for selecting services and
controlling the operation of the SCP router 22. The service arbitration logic
26 is further coupled to a subscriber database 28 that contains listings of
35 subscriber addresses 30 and types of services 32 affiliated thereto. For
example, subscriber address "1000" (which corresponds to subscriber unit
12) has services A, B and X associated therewith. As such, in response to

a trigger from an identified subscriber unit, the SCP router 22 is able to invoke the requisite services based on the information in the subscriber database 28. Furthermore, although the subscriber database is shown as a discrete database located outside the physical confines of the SCP router 22, it will be appreciated that the subscriber database may equally well be implemented within the SCP router 22. The service arbitration logic 26 is further responsive to a service router database 34, which database identifies particular services provided by secondary SCPs, for example, (typically through their addresses within the system). More particularly, in the service router database 34 of FIG. 1, an address field 35 is used to identify the locations (memory addresses or physical addresses) of either the internal service logic or the proprietary services that reside outside the SCP router 22. In this way, the service router database 34 is integral in providing/routing the service to the subscriber unit through the identification of the location of the service. Optionally, the service router database 34 may associate particular services with particular triggers, so a particular service will only be invoked by a particular trigger. Although information relating to the trigger is currently shown as residing in the service router database 34, this is not to say that this information need reside at this specific location. Indeed, the information need only be associated with the services affiliated with the subscriber unit.

SCP router 22 is also coupled to secondary SCPs 36-40, which respectively provide services (B and C), (P, Q and R) and (X, Y and Z). Therefore, where necessary, the service arbitration logic 26 is able to route a request for a service (generated by a trigger) to any one of a plurality of secondary SCPs. Therefore, the SSP 14 is able to access a service resident on a secondary SCP, even though the SSP always initially accesses the SCP router 22. Optionally, each secondary SCP may contain control logic 42-46, and may be coupled to at least one other secondary SCP. Therefore, in the event that the SCP router 22 determines that multiple services are to be provided from a single trigger, and that these services are provided on different secondary SCPs 36-40, the control logic 42-46 in the secondary SCPs may be utilised to intelligently re-direct a request for a service between secondary SCPs, rather than via the SCP router 22. As such, processing overhead in the system is reduced.

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For the sake of simplicity, only three additional services providers are illustrated, although a network may contain fewer or substantially more. Additionally, these secondary SCPs may be proprietary, third party-owned systems, and may each contain one or more services.

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In operation, a network operator is responsible for overseeing the operation of the (primary) SCP, i.e. the SCP router 22, that manages the multiplicity of services without the need for additional signalling with the SSP 14. The SCP contains service arbitration functionality that can
10 determine, select and invoke more than one service in response to a trigger (through the identification of the location/address of the service). With respect to selection, two principal methods are available, namely Precedence Arbitration and Subset Arbitration. In this respect, Precedence Arbitration requires services to be logically tested for
15 invocation on a predetermined priority basis. Therefore, if a particular service is not invoked because of prevailing trigger conditions, that particular service possibility is discarded and the next service tested for applicability. In Subset Arbitration, the services are designed such that one service can only be invoked after a more fundamental (precursor)
20 service has been previously invoked and that certain conditions (when required) have subsequently arisen. In either case, the service router database 34 provides a mechanism for directing the subscriber unit 12 to the relevant service logic (whether it is stored within the SCP router 22 or in one of the plurality of secondary SCPs).

25

The present invention therefore advantageously provides a flexible intelligent network having service functions distributed and controlled between the SCP router and at least one secondary SCP responsive thereto. Therefore, the system of the present invention allows optimised system
30 construction through the ability to modify systems to include proprietary third-party services, thereby providing more service opportunities per subscriber.

Therefore, the SCP router 22 acts as a routing node and determines either
35 the dominant service from a plurality of requested services or the order in which services are provided of service requested (both scenarios being triggered from a single boundary 20). As such, the SCP router 22 provides

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an arbitration service over triggers and accordingly routes a call to a proprietary service provider or to the necessary, internal service logic 24 (subject to the arbitration process). Thus, the SCP router is able to manage multiple services and service logic locations without complicating the

5 underlying trigger mechanisms.

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Claims

1. A communication system for providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the subscriber unit during a call, the communication system comprising:
 - a service control point (SCP) router, responsive to the trigger, having a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber unit in the list, the SCP router further comprising means for identifying an address of the at least one subscriber affiliated service in the system and means for invoking the at least one subscriber affiliated service for use by the subscriber unit through the routing of the subscriber unit to the address so identified.
2. The communication system of claim 1, further comprising a plurality of secondary SCPs each comprising at least one service.
3. The communication system of claim 2, wherein the plurality of secondary SCPs each comprise control logic and wherein at least one secondary SCP of the plurality of secondary SCPs is coupled to at least one other secondary SCP of the plurality of secondary SCPs.
4. The communication system of claim 1, 2 or 3, wherein the trigger is a boundary between sections of a call model.
5. The communication system of any preceding claim, wherein the SCP router comprises at least one service.
6. The communication system of any preceding claim, wherein the means for invoking the at least one subscriber affiliated service logically sequences through the associated services affiliated with a subscriber unit to invoke a first available service.
7. The communication system of any preceding claim, wherein the means for invoking the at least one subscriber affiliated service invokes a second service associated with the subscriber unit only after invoking a first service associated with the subscriber unit.

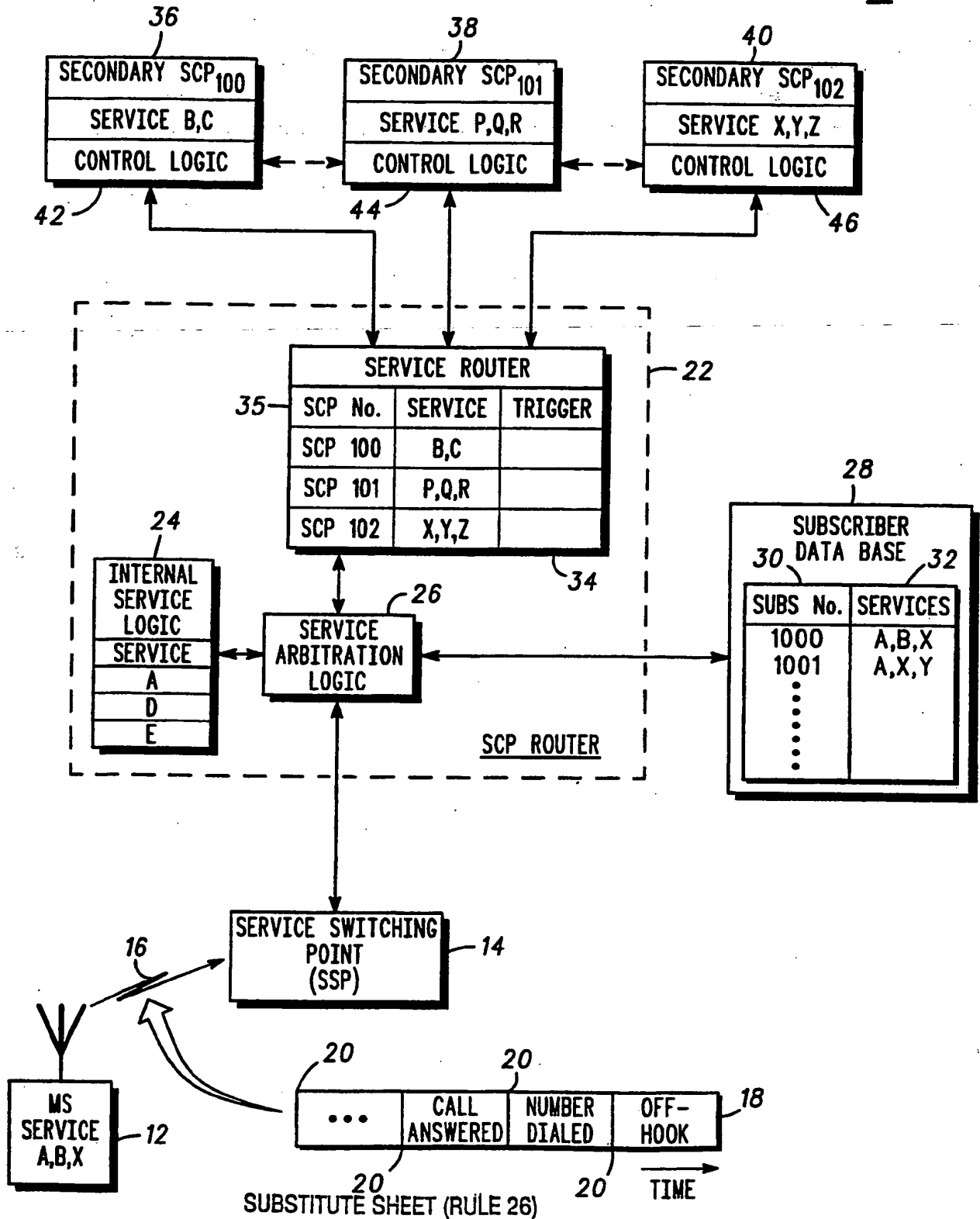
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8. A service controller for call handling in an intelligent network, the service controller providing at least one subscriber affiliated service to a subscriber unit in response to a trigger generated by the subscriber unit during a call, the service controller having:
- 5 a subscriber database containing a list of subscriber units and associated services affiliated with each subscriber unit in the list;
means for identifying an address of the at least one subscriber affiliated service in the system; and
means for invoking the at least one subscriber affiliated service for
10 use by the subscriber unit through the routing of the subscriber unit to the address so identified.
9. The service controller of claim 8, wherein the trigger is a boundary between sections of a call model.
- 15 10. The service controller of claim 8 or 9, wherein the service controller comprises at least one internal service.
11. The service controller of claim 8, 9 or 10, wherein the means for
20 invoking the at least one subscriber affiliated service logically sequences through the associated services affiliated with a subscriber unit to invoke a first available service.
12. The service controller of any one of claims 8 to 11, wherein the
25 means for invoking the at least one subscriber affiliated service invokes a second service associated with the subscriber unit only after invoking a first service associated with the subscriber unit.

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FIG. 1

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INTERNATIONAL SEARCH REPORT

International Application No
PLI/EP 96/03538

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04Q3/00 H04Q7/38 H04M3/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04Q H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	IEEE NETWORK, vol. 8, no. 2, March 1994 - April 1994, NEW YORK US, pages 6-16, XP000515075 LAUER: "IN architectures for implementing Universal Personal Telecommunications" see page 9, left-hand column, line 1 - right-hand column, last line see page 12, left-hand column, line 20 - right-hand column, line 19 ---	1,2,5,6, 8,10,11
X	EP,A,0 654 930 (AT & T) 24 May 1995 see column 4, line 53 - column 5, line 40; claim 1 --- -/--	1,6,8,11

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ANNUAL REVIEW OF COMMUNICATIONS, vol. 48, 1994 - 1995, CHICAGO US, pages 557-569, XP000543205 PENKLER ET AL.: "Evolving open Intelligent Networks for global and broadband services" see page 562, left-hand column, paragraph 2 - page 565, left-hand column, paragraph 2; figures 6-11 ---	1-3,6,8, 11
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Information on patent family members

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